



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

09/855,132

05/14/2001

Eric A. Jacobsen

INTL-0548-US (P11107)

9082

7590

01/28/2004

Timothy N. Trop
TROP, PRUNER & HU, P.C.
STE 100
8554 KATY FWY
HOUSTON, TX 77024-1805

EXAMINER

LEVITAN, DMITRY

ART UNIT

PAPER NUMBER

2662

DATE MAILED: 01/28/2004

5

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/855,132

Applicant(s)

JACOBSEN, ERIC A.

Examiner

Dmitry Levitan

Art Unit

2662

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 September 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Art Unit: 2662

Drawings

✓ 1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 11, 13, 14, 20, 31, 33 and 35. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 4, 8, 9, 18, 19, 28 and 29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification does not provide sufficient details to enable a skilled in the art to make and use the invention because it does not adequately describe the following:

✓ Regarding claim 4, how to apply a weighting function during the DFT to perform symbol shaping;

✓ Regarding claims 8, 18 and 28, how to transmit each of the symbols during one of the intervals that exceeds the symbol generation interval.

Art Unit: 2662

- ✓ Regarding claims 9, 19 and 29, how to selectively pre-rotate phases of one or more sub-carriers to generate a cyclic prefix.

The specification does not provide enough details about the structure and operation of the elements associated with the above identified claimed features to enable one skilled in the art to make and use the invention without undue experimentation.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

5. Claims 1-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- OK Claims 1, 11 and 21 limitation "discrete frequency transformation" is unclear, because it is not described in the specification or well known in the art. Compare with discrete Fourier transformation, well known in the art.

- OK Claims 14 and 24 limitation "components of DFT" is unclear, because it is not described in the specification or well known in the art.

- ✓ 6. Claim 18 recites the limitations "the symbols" in line 1 and "the symbol generation interval" in line 2. There is insufficient antecedent basis for these limitations in the claim.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-7, 9-17, 19-27, 29 and 30 are rejected under 35 U.S.C. 102(e) as being anticipated by van Nee (US 6,175,550).

Regarding claims 1-3, 11-13 and 21-23, van Nee teaches a method, a system and storage medium instructions (Fig. 1 and 3:66-67, 4:1-17,10:34-48), comprising:

Basing a DFT (IDFT 16 on Fig. 1 and 4:44-48, 3:53-58) on the number of sub-carriers (N carriers 6:10-14) in a predetermined set of sub-carriers (X carriers 6:10-14), one or more sub-carriers of the set assigned to modulate data (5:58-67 and 6:1-9) and the remaining sub-carriers of the set not assigned to modulate the data (5:58-67 and 6:1-9);

Performing DFT on the data to modulate the data (IDFT 16 on Fig. 1) and

Excluding from the transformation mathematical operations associated with the sub-carriers not assigned to modulate the data (X-point IFFT 6:10-14).

Regarding claim 4, van Nee teaches applying a weighting function (windowing 6:23-35) during DFT to perform symbol shaping (6:32-35).

Regarding claims 5, 15 and 25, van Nee teaches sub-carriers assigned to users (remote stations 74 on Fig. 5 and 7:40-61).

Regarding claims 6, 16 and 26, van Nee teaches forming an OFDM symbol (4:57-60).

Art Unit: 2662

Regarding claims 7, 17 and 27, van Nee teaches using the transformation to generate symbols at a rate defined by symbol generation interval (Symbol duration T_s 5:6-23); basing the DFT on the symbol generation interval (4:58-67); and Using DFT to generate discrete modulated values for an interval that exceeds the symbol generation interval (5:6-22) to generate a cyclic extension (guard time 6:24-31).

Regarding claims 10, 20 and 30, van Nee teaches the mathematical operations of accumulation and multiplication (inherently part of IFFT technique, admitted as conventional IFFT technique in current application Fig. 2 and 5:3-8).

Regarding claims 14 and 24, van Nee teaches determining components of DFT independently from each other (orthogonal carriers 6:10-23).

Regarding claims 9, 19 and 29, van Nee teaches selectively pre-rotating phases of sub-carriers (phase shift keying 4:31-43) to generate a cyclic prefix (Cyclic prefix 18 on Fig. 1).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8, 18 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over van Nee in view of Bohnke (US 6,535,501).

Van Nee substantially teaches all the limitations of claims 1, 7 and 8.

Art Unit: 2662

van Nee does not teach transmitting symbols during the intervals that exceeds the symbol generation interval.

Bohnke teaches transmitting symbols during the intervals that exceeds the symbol generation interval (transmitting symbols during the guard band intervals 1:38-56). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add transmitting symbols during the intervals that exceeds the symbol generation interval of Bohnke to the system of van Nee to improve the system spectral efficiency.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Bohnke US006545997B1 Transmission method, apparatus for transmitting signals on the basis of a OFDM/TDMA system.

Mason US005488632A Transmission and reception in a hostile interference environment.

Bohnke US006567383B1 Header structure for TDD systems.

Sayeed US006456653B1 Fast and accurate signal to noise estimation technique for OFDM systems.

Frodigh US005726978 Adaptive channel allocation in a FDM system.

Larsson US005956642A Adaptive channel allocation method and apparatus for multi-carrier communication system.

Hakkinen US006282185B1 Transmitting and receiving method and radio system.

Isaksson US006366554B1 Multi-carrier transmission system.

Art Unit: 2662

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dmitry Levitan whose telephone number is 703-305-4384. The examiner can normally be reached on 8:30 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on 703-305-4744. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4750.



Dmitry Levitan
Patent Examiner.
01/13/04.



HASSAN KIZOU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600